Raymond Quadrangle, Maine

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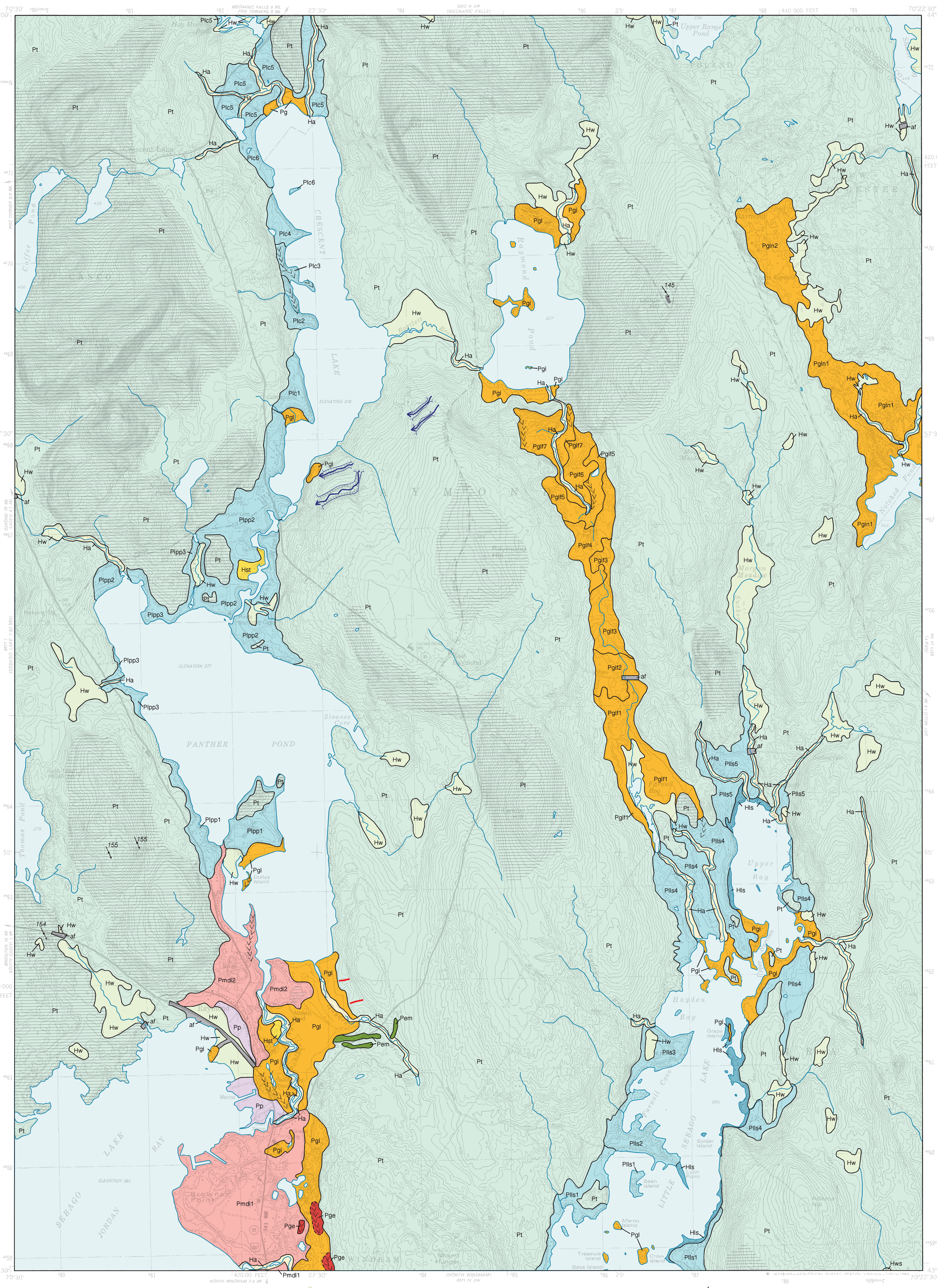
For additional information, see Open-File Report 97-72.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Michael J. Retelle completed during the 1996-1997 field seasons; funding for this work provided by the U. S. Geological Survey STATEMAP program.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Raymond quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

HOLOCENE DEPOSITS

Ha — **Stream alluvium** - Sand, silt and minor amounts of gravel deposited on flood plains of modern streams

Hst — **Stream terraces** - Flat alluvial benches situated above modern flood plains of streams. Materials forming the depositional terrace include gravel, sand, silt, and clay; step-like morphology is created by downcutting of the stream through previously deposited material, of glacial or postglacial origin and age.

Hls — **Lake shore deposits** - Narrow sand and gravel deposits formed by wave and current action on modern lake shores.

Hw — **Wetland** - Undifferentiated wetland, underlain by peat, muck, silt, or clay.

Hws — **Wetland, swamp** - Peat and fine-grained inorganic sediment. Poorly drained area with standing water common.

PLEISTOCENE DEPOSITS

Pp — **Presumpscot Formation** - Fine-grained marine mud (silt and clay with local sandy beds and intercalations), locally with marine fossils and dropstones. Deposited in deeper, quieter water during the marine submergence of the coastal lowland.

Pmdi — **Marine ice-contact delta** - Flat-topped ice-contact delta composed primarily of sorted and stratified sand and gravel. Deposit was graded to surface of late-glacial sea and is distinguished by flat top and foreset and topset beds.

$Pmdi_2$ - Raymond delta
$Pmdi_1$ - Browns Point delta

Pl — **Lake deposits** - Predominantly sand and gravel deposited in ice-contact lakes in the Panther Pond and Crescent and Little Sebago Lake basins. Ice-contact glaciofluvial and glaciodeltaic deposits are graded to drift dams which block the meltwater drainage in the southern end of the respective valleys.

$Plls_x$ - Glacial Little Sebago Lake 1 to 5
Plc_x - Glacial Crescent Lake 1 to 6
$Plpp_x$ - Glacial Panther Pond 1 to 3

Pgi — **Ice-contact deposits** - Deposits of predominantly ice-contact sand and gravel in Farwell Brook and Notched Pond lowlands, which include a series of shingled fluvial ice-contact morphosequences in the Farwell Brook and Valley Brook valleys.

$Pgif_x$ - Farwell Brook deposits 1 to 7
$Pgin_x$ - Notched Pond deposits 1 to 2

Pg — **Ice-contact stratified drift** (undifferentiated) - Sand and gravel deposited by meltwater streams in contact with glacier ice.

Pge — **Esker** - Gravel and sand deposited in an ice tunnel by subglacial meltwater stream. Chevrons indicate inferred direction of glacial stream flow.

Pem — **End moraine** - Ridge of till and/or sand and gravel deposited at the glacier margin during recession of the last ice sheet.

Pt — **Till** - Poorly sorted mixture of gravel, sand, silt, and clay deposited directly by the action of glacier ice.

Bedrock - Gray dots indicate individual outcrops of ledge exposed at the surface. Horizontal ruled pattern indicates areas where bedrock is covered by a thin veneer of drift.

af — **Artificial fill** - Mixture of till, gravel, sand, clay and artificial materials transported and dumped to form elevated sections of roadways, etc.

Contact - Indicates boundary between adjacent map units, dashed where approximated.

135 — **Glacial striation or groove** - Arrow shows direction of former ice movement. Dot marks point of observation.

Broad meltwater channel - Channel eroded by glacial meltwater flow. Hachured lines indicate channel margins. Arrow indicates known or inferred flow direction.

End moraine - Ridge of till, sand, and gravel deposited and/or deformed by glacier ice.

<<<<< **Esker** - Gravel and sand deposited in an ice tunnel by subglacial meltwater stream.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Retelle, M. J., 1997, Surficial geology of the Raymond 7.5-minute quadrangle, Cumberland County, Maine: Maine Geological Survey, Open-File Report 97-72, 8 p.
2. Retelle, M. J., 1998, Surficial materials of the Raymond quadrangle, Maine: Maine Geological Survey, Open-File Map 98-189.
3. Neil, C. D., 1998, Significant sand and gravel aquifers of the Raymond quadrangle, Maine: Maine Geological Survey, Open-File Map 98-155.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
6. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.